4.6 Emission Rates

The previous sections have described various data analyses that were used for regime growth functions and the I&M analysis. This section presents the basic emission rate data, by technology group and emissions regime.

4.6.1 Introduction

All data from the surveillance data sets and the I&M data sets (including the 1994 pilot program) were used to compute the emission rate by technology group and regime. This full data set was used to get as many vehicles as possible for the emission rates of the individual regimes and technology groups, particularly for the super-emitting regimes, which have a small number of vehicles. This means that the vehicles, which were used to determine the regime boundaries and growth rates, were only a subset of the vehicles, which were eventually used to determine the regime *emission rates*.

For the normal regime only, the emission rate can depend on mileage (which is directly linked to vehicle age in EMFAC2000.) The emissions versus mileage relationship is a linear regression. The EMFAC2000 slope is non-zero only in cases where the regression slope is statistically different from zero at the 95% confidence level, *and* the slope increases emissions by 10% or more of the emission standard over 50,000 miles.* For all other regimes the emission rate is not a function of mileage. As in the CALIMFAC model, the emission rate is calculated using the arithmetic mean of all emission rates in the regime.

For some technology-group/regime combinations there were not enough data to get a valid emission rate. In these cases, data from similar technology groups and/or regimes were used. These adjustments to the data are shown in Table 4-40.

Table 4-40
Data Substitutions for Emission Rate Values

Species	Regime	New Technology Group	Data Used
HC	Very High & Super	6 (oxidation catalyst, 1980-and-later model years)	Oxidation catalyst, 1975 and later model years
	Super	13 (1986 and later, TWC, MPFI, 0.7 NOx)	1981 and later, TWC, MPFI, 0.7 NOx
	Super	14 (1981 and later, TWC, TBI/Carb, 0.4 NOx)	1981 and later, TWC, TBI/Carb, 0.7 NOx
	Very High & Super	15 (1981 and later, TWC, MPFI, 0.4 NOx)	1981 and later, TWC, MPFI, 0.4 & 0.7 NOx
CO	Super	1 and 2 (pre-1975 without and with secondary air)	Use very high value for same technology groups
	Very High & Super	6 (oxidation catalyst, 1980 and later model years)	Oxidation catalyst, 1975 and later model years
	Very High & Super	14 (1981 and later, TWC, TBI/Carb, 0.4 NOx)	1981 and later, TWC, TBI/Carb, 0.4 & 0.7 NOx

	Very High & Super	15 (1981 and later, TWC, MPFI, 0.4 NOx)	1981 and later, TWC, MPFI, 0.4 & 0.7 NOx
NOx	Super	8 (1975-1979 TWC with TBI/Carb)	Same as very high for the technology group
	Very High & Super	6 (oxidation catalyst, 1980 and later model years)	Oxidation catalyst, 1975 and later model years

4.6.2 Future Technology Groups

Data on regime growth functions, emission rates and I&M identification and repair rates for new technology groups are required to obtain model results for future calendar years. The available surveillance data set covers technology groups one through sixteen. The data for future technology groups is generally found by using data for existing technology groups with similar control technologies. Appropriate adjustments are made to account for lower emission standards in future technology groups. In the discussion below the new technology groups whose properties are found from other groups are called derived groups. The technology groups providing the data are called reference groups.

4.6.2.1 Technology groups 17 and 18

These groups are 1993 and later, three-way catalyst (TWC), with emission standards of 0.25 g/mi. HC and 0.4 g/mi. NOx. Group 17 uses throttle body injection or carburetors (TBI/Carb) and group 18 uses multipoint fuel injection (MPFI). They were included in CALIMFAC as group numbers 15 and 16. In EMFAC2000, these groups have the same regime growth functions as groups 14 and 15,* which have the same emission control technology but different emission standards. The emission rates for new groups 17 and 18 are found from new groups 14 and 15 by the following adjustment process. This is the same process used in the original CALIMFAC analysis.

- The intercept for the normal regime emissions in the derived groups (17 and 18 in this case) is found by multiplying the normal intercept in the reference groups (14 and 15) by ratio of emission standards (0.25/0.39 for HC, 3.4/7.0 for CO, and 1.0 for NOx).

- The slope giving the increase in the normal emissions with odometer reading in the derived group is the same as the slope in the reference group.

- The mean emission rates for the moderate, high, very highs and supers in the derived groups are found by multiplying the corresponding emission rates in the reference groups by ratio of emission standards.

This same adjustment procedure was used for all other derived groups with new emission standards.

The I&M data (identification rate and move matrix) for groups 17 and 18 are the same as those for groups 15 and 16, respectively.

4.6.2.2 Technology groups 19 and 20

These differ from groups 17 and 18, respectively, only in the presence of second-generation onboard diagnostics (OBD II.) The emission rates for technology groups 19 and 20 are the same as the reference groups 17 and 18. The regime growth functions for groups 19 and 20 are a modification of the regime growth functions for groups 17 and 18, which account for the presence of OBD II.

ARB staff believes that OBD II will eliminate high, very high, and super emitters for up to 70,000 miles. This is readily handled because of the existing treatment for the regime growth functions. As noted earlier, the raw regime growth functions, for a given odometer reading, are adjusted so that values below zero are set to zero and values above one are set to one. Thus, if the existing regime growth functions for high, very high or super are zero for all odometer readings below 70,000 miles no adjustment is required. If the regime growth functions gives a positive population fraction in these regimes the regime growth function equation can be adjusted so that its population is zero for all odometer readings below 70,000 miles.

In addition to the adjustment of the regime growth functions, ARB staff believes that vehicles with OBD II will be readily identified and repaired in I&M procedures. Following their direction, two separate modifications were used in EMFAC2000 for OBD II vehicles:

- The mechanic inspection efficiency for visual/functional tests was set to 95% for all checks used in the visual/functional test.

- The move matrix for OBD II vehicles was modified so that, after repair, OBD II vehicles migrate evenly to the moderate and normal emission regimes. This was done by setting the move-matrix components for the high, very high, and super regimes so that 50% of the population in each of these before-repair regimes to the normal regime after repair and 50% to the moderate regime. The move matrix for OBD II vehicles originally in the normal and moderate regimes was not changed.

The procedures discussed here for technology groups 19 and 20 were used to adjust the regime growth functions and the I&M data for all technology groups with OBD II.

4.6.2.3 Technology groups 21 and 22

These are transitional low emission vehicles (TLEVs) which are assumed to use using TWC with MPFI. Group 21 does not have OBD II but group 22 does.

4.6.2.4 Technology groups 23 and 24

These are low-emission vehicles (LEVs) and and ultra-low-emission vehicles (ULEVs). These groups use the same regime growth functions and I&M data as the TLEVs in group 22. The

following ratios of emission standards were used in the emission rate adjustment procedure: $HC_{23}/HC_{22} = 0.5$, $HC_{24}/HC_{23} = 40/75$, $CO_{24}/CO_{23} = 0.5$, and $NOx_{23}/NOx_{22} = 0.5$. All other standard ratios are unity.

Recent certification data was used to obtain emissions data for the normal regime for TLEVs, LEVs and ULEVs.

4.6.2.5 Technology group 25

These are zero-emission vehicles (ZEVs) for which the emission rate of all regimes is zero. The population of normals is set to one and the population of all other regimes is set to zero for all odometer readings. The identification rate for I&M is zero.

4.6.2.6 Technology groups 26 and 27

These groups are used for light and medium-duty trucks for 1996 and later model years. These vehicles meet a 0.7 g/mi. NOx standard and are equipped with OBD II. Both groups will use three-way catalysts. Group 26, with TBI/Carb, will use the regime growth functions for group 10; group 27 with MPFI will use the regime growth functions for group 13. Both sets of regime growth functions are adjusted for OBD II as described in the discussion of technology groups 19 and 20. The HC and CO emission rates for these groups will be scaled from the group 10 and 13 emission rates to the 1995 and later standards for LDTs with weights between 3,751 and 5,750 pounds.* This gives standard ratios of 0.32/0.39 for HC and 4.4/7.0 for CO to be used for adjusting the emission rates. The identification rates and the move matrices for these groups 26 and 27 are also taken from similar data for groups 10 and 13, respectively. However, those data are adjusted for OBD II in the same manner described for technology groups 19 and 20.

4.6.2.7 Technology groups 28 to 30

These groups represent vehicles certifying to the LEV II emission standards. Section 4.9 details how these emission rates were calculated for these technology groups.

4.6.2.8 Technology groups 40-43

These groups represents Mexican vehicles which are considered in the emission inventories for San Diego and Imperial Counties (Section 12.0). These groups represent the following emission control technologies:

Group 40 – Non-catalyst vehicles
Group 41 - Oxidation catalyst vehicles
Group 42 - Three-way catalyst vehicles with TBI/Carb
Group 43 - Three-way catalyst vehicles with MPFI

The FTP based emission rates for HC, CO and NOx are shown in Tables 4-41, 4-42 and 4-43, respectively.

Table 4-41 Hydrocarbon Emission Rate (g/mi.)

Technology Group and Regime			Raw Averages					Final data with adjustments for missing data					
Old Tech	New Tech	Regime	Number	Bag One	Bag Two	Bag 3	Comp	Number	Bag One	Bag Two	Bag 3	Comp	Adjustment Method
	1	1 Normal	305	4.816	2.963	3.220	3.570	305	4.816	2.963	3.220	3.570	
	1	1 Moderate	255	7.995	5.722	5.144	6.404	255	7.995	5.722	5.144	6.404	
	1	1 High	37	11.686	12.938	9.169	12.983	37	11.686	12.938	9.169	12.983	
	1	1 Very High	14	27.327	25.677	23.038	25.839	14	27.327	25.677	23.038	25.839	
	1	1 Super	18	36.403	40.943	32.918	38.457	18	36.403	40.943	32.918	38.457	
	2	2 Normal	144	4.572	1.986	2.041	2.402	144	4.572	1.986	2.041	2.402	
	2	2 Moderate	78	7.162	4.920	4.828	5.331	78	7.162	4.920	4.828	5.331	
	2	2 High	13	16.738	13.010	10.797	12.959	13	16.738	13.010	10.797	12.959	
	2	2 Very High	5	18.573	23.807	20.595	20.027	5	18.573	23.807	20.595	20.027	
	2	2 Super	12	31.533	31.088	34.209	37.332	12	31.533	31.088	34.209	37.332	
	3	3 Normal	70	1.548	0.505	0.767	0.787	70	1.548	0.505	0.767	0.787	
	3	3 Moderate	64	2.814	0.882	1.206	1.368	64	2.814	0.882	1.206	1.368	
	3	3 High	67	4.684	1.672	1.542	2.248	67	4.684	1.672	1.542	2.248	
	3	3 Very High	14	9.697	4.072	3.960	5.218	14	9.697	4.072	3.960	5.218	
	3	3 Super	3	12.394	15.449	7.580	12.643	3	12.394	15.449	7.580	12.643	
	4	4 Normal	312	1.577	0.271	0.495	0.602	312	1.577	0.271	0.495	0.602	

4	4	Moderate	139	2.777	0.778	1.026	1.258	139	2.777	0.778	1.026	1.258		
4	4	High	172	5.684	2.956	2.646	3.438	172	5.684	2.956	2.646	3.438		
4	4	Very High	23	12.935	8.735	7.388	9.257	23	12.935	8.735	7.388	9.257		
4	4	Super	9	28.230	25.989	21.855	25.470	9	28.230	25.989	21.855	25.470		
5	ELIMINATED	Normal	81	1.365	0.210	0.409	0.503	81	1.365	0.210	0.409	0.503		
5	ELIMINATED	Moderate	102	2.732	0.799	0.799	1.201	102	2.732	0.799	0.799	1.201		
5	ELIMINATED	High	143	4.705	2.474	2.159	2.854	143	4.705	2.474	2.159	2.854		
5	ELIMINATED	Very High	18	7.892	5.381	3.830	5.523	18	7.892	5.381	3.830	5.523		
5	ELIMINATED	Super	22	22.848	15.996	14.704	17.141	22	22.848	15.996	14.704	17.141		
5.1	5	Normal	60	1.568	0.261	0.503	0.597	60	1.568	0.261	0.503	0.597		
5.1	5	Moderate	75	3.078	1.020	0.974	1.433	75	3.078	1.020	0.974	1.433		
5.1	5	High	134	4.832	2.577	2.239	2.956	134	4.832	2.577	2.239	2.956		
5.1	5	Very High	18	7.892	5.381	3.830	5.523	18	7.892	5.381	3.830	5.523		
5.1	5	Super	22	22.848	15.996	14.704	17.141	22	22.848	15.996	14.704	17.141		
5.2	6	Normal	21	0.832	0.078	0.161	0.257	21	0.832	0.078	0.161	0.257		
5.2	6	Moderate	27	1.784	0.193	0.320	0.556	27	1.784	0.193	0.320	0.556		
5.2	6	High	9	2.809	0.939	0.970	1.335	9	2.809	0.939	0.970	1.335		
5.2	6	Very High	0					18	7.892	5.381	3.830	5.523	Old group 5	
5.2	6	Super	0					22	22.848	15.996	14.704	17.141	Old group 5	
6	7	Normal	361	0.954	0.159	0.273	0.354	361	0.954	0.159	0.273	0.354		

6	7	Moderate	493	1.648	0.306	0.499	0.636	493	1.648	0.306	0.499	0.636
6	7	High	434	3.362	1.179	1.308	1.668	434	3.362	1.179	1.308	1.668
6	7	Very High	96	6.326	3.639	3.394	4.129	96	6.326	3.639	3.394	4.129
6	7	Super	43	18.950	14.072	12.111	14.649	43	18.950	14.072	12.111	14.649
7	8	Normal	4	1.004	0.123	0.189	0.327	4	1.004	0.123	0.189	0.327
7	8	Moderate	14	1.501	0.322	0.474	0.610	14	1.501	0.322	0.474	0.610
7	8	High	10	3.009	1.408	1.370	1.734	10	3.009	1.408	1.370	1.734
7	8	Very High	3	5.812	4.698	2.763	4.398	3	5.812	4.698	2.763	4.398
7	8	Super	6	13.508	12.179	7.893	11.280	6	13.508	12.179	7.893	11.280
7.1	ELIMINATED	Normal	74	0.930	0.093	0.185	0.292	74	0.930	0.093	0.185	0.292
7.1	ELIMINATED	Moderate	86	1.621	0.291	0.430	0.605	86	1.621	0.291	0.430	0.605
7.1	ELIMINATED	High	83	3.035	1.242	1.275	1.622	83	3.035	1.242	1.275	1.622
7.1	ELIMINATED	Very High	43	4.908	3.640	2.873	3.759	43	4.908	3.640	2.873	3.759
7.1	ELIMINATED	Super	15	15.505	11.560	8.508	11.534	15	15.505	11.560	8.508	11.534
8.91	9	Normal	265	0.792	0.133	0.230	0.296	265	0.792	0.133	0.230	0.296
8.91	9	Moderate	408	1.468	0.333	0.507	0.616	408	1.468	0.333	0.507	0.616
8.91	9	High	272	2.778	1.091	1.184	1.466	272	2.778	1.091	1.184	1.466
8.91	9	Very High	78	5.083	3.219	2.682	3.457	78	5.083	3.219	2.682	3.457
8.91	9	Super	25	16.441	12.966	12.093	13.432	25	16.441	12.966	12.093	13.432
8.92	10	Normal	162	0.773	0.116	0.204	0.276	162	0.773	0.116	0.204	0.276

8.92	10 Moderate	138	1.350	0.356	0.470	0.593	138	1.350	0.356	0.470	0.593		
8.92	10 High	74	2.798	1.242	1.340	1.591	74	2.798	1.242	1.340	1.591		
8.92	10 Very High	24	5.268	3.102	3.017	3.521	24	5.268	3.102	3.017	3.521		
8.92	10 Super	3	7.573	10.189	5.433	8.337	3	7.573	10.189	5.433	8.337		
10	11 Normal	26	0.922	0.093	0.178	0.288	26	0.922	0.093	0.178	0.288		
10	11 Moderate	25	1.594	0.312	0.436	0.612	25	1.594	0.312	0.436	0.612		
10	11 High	25	2.588	1.459	1.350	1.662	25	2.588	1.459	1.350	1.662		
10	11 Very High	12	4.290	3.963	2.730	3.691	12	4.290	3.963	2.730	3.691		
10	11 Super	2	10.267	7.923	10.223	8.999	2	10.267	7.923	10.223	8.999		
11.1	12 Normal	59	0.904	0.097	0.183	0.288	59	0.904	0.097	0.183	0.288		
11.1	12 Moderate	124	1.632	0.337	0.426	0.630	124	1.632	0.337	0.426	0.630		
11.1	12 High	78	2.662	1.154	1.078	1.446	78	2.662	1.154	1.078	1.446		
11.1	12 Very High	18	5.597	3.158	2.511	3.484	18	5.597	3.158	2.511	3.484		
11.1	12 Super	5	7.602	7.615	5.040	6.908	5	7.602	7.615	5.040	6.908		
11.2	13 Normal	170	0.921	0.077	0.139	0.269	170	0.921	0.077	0.139	0.269		
11.2	13 Moderate	113	1.438	0.284	0.407	0.557	113	1.438	0.284	0.407	0.557		
11.2	13 High	35	2.749	1.131	1.082	1.453	35	2.749	1.131	1.082	1.453		
11.2	13 Very High	8	3.842	3.833	2.427	3.448	8	3.842	3.833	2.427	3.448		
11.2	13 Super	1	25.370	23.962	20.226	23.226	6	10.563	10.340	7.571	9.628	From old 11.1 and 11.2	
12	14 Normal	18	0.607	0.103	0.190	0.231	18	0.607	0.103	0.190	0.231		

12	14 Moderate	18	1.313	0.322	0.527	0.584	18	1.313	0.322	0.527	0.584	
12	14 High	9	2.571	1.293	1.317	1.564	9	2.571	1.293	1.317	1.564	
12	14 Very High	2	6.035	3.072	3.636	3.839	2	6.035	3.072	3.636	3.839	
12	14 Super	0					28	15.491	12.668	11.379	12.886	From old 12, 8.91 and 8.92
13	15 Normal	88	0.872	0.061	0.126	0.247	88	0.872	0.061	0.126	0.247	
13	15 Moderate	30	1.628	0.271	0.406	0.589	30	1.628	0.271	0.406	0.589	
13	15 High	10	2.580	1.455	1.489	1.698	10	2.580	1.455	1.489	1.698	
13	15 Very High	1	2.866	3.397	2.399	3.012	27	4.976	3.367	2.482	3.456	From old 11.1, 11.2, and 13
13	15 Super	0					6	10.563	10.340	7.571	9.628	From old 11.1, 11.2, and 13
14	16 Normal	44	0.928	0.089	0.188	0.291	44	0.928	0.089	0.188	0.291	
14	16 Moderate	47	1.668	0.272	0.415	0.599	47	1.668	0.272	0.415	0.599	
14	16 High	48	3.272	1.095	1.217	1.577	48	3.272	1.095	1.217	1.577	
14	16 Very High	28	5.082	3.389	2.946	3.719	28	5.082	3.389	2.946	3.719	
14	16 Super	7	18.713	12.068	8.545	12.477	7	18.713	12.068	8.545	12.477	
15	17 Normal							0.389	0.066	0.122	0.148	.25/.39 times new 14
15	17 Moderate							0.842	0.206	0.338	0.374	.25/.39 times new 14
15	17 High							1.648	0.829	0.844	1.003	.25/.39 times new 14
15	17 Very High							3.869	1.969	2.331	2.461	.25/.39 times new 14
15	17 Super							9.930	8.121	7.295	8.260	.25/.39 times new 14
16	18 Normal							0.559	0.039	0.081	0.158	.25/.39 times new 15
16	18 Moderate							1.044	0.174	0.260	0.378	.25/.39 times new 15
16	18 High							1.654	0.933	0.954	1.088	.25/.39 times new 15
16	18 Very High							3.190	2.158	1.591	2.215	.25/.39 times new 15
16	18 Super							6.771	6.628	4.853	6.172	.25/.39 times new 15
	19 Normal							0.389	0.066	0.122	0.148	Same as new 17
	19 Moderate							0.842	0.206	0.338	0.374	Same as new 17

19 High	1.648	0.829	0.844	1.003	Same as new 17
19 Very High	3.869	1.969	2.331	2.461	Same as new 17
19 Super	9.930	8.121	7.295	8.260	Same as new 17
20 Normal	0.559	0.039	0.081	0.158	Same as new 18
20 Moderate	1.044	0.174	0.260	0.378	Same as new 18
20 High	1.654	0.933	0.954	1.088	Same as new 18
20 Very High	3.190	2.158	1.591	2.215	Same as new 18
20 Super	6.771	6.628	4.853	6.172	Same as new 18
21 Normal	0.279	0.020	0.040	0.079	Half of new 20
21 Moderate	0.522	0.087	0.130	0.189	Half of new 20
21 High	0.827	0.466	0.477	0.544	Half of new 20
21 Very High	1.595	1.079	0.796	1.108	Half of new 20
21 Super	3.386	3.314	2.427	3.086	Half of new 20
22 Normal	0.279	0.020	0.040	0.079	Half of new 20
22 Moderate	0.522	0.087	0.130	0.189	Half of new 20
22 High	0.827	0.466	0.477	0.544	Half of new 20
22 Very High	1.595	1.079	0.796	1.108	Half of new 20
22 Super	3.386	3.314	2.427	3.086	Half of new 20
23 Normal	0.140	0.010	0.020	0.040	Half of new 22
23 Moderate	0.261	0.043	0.065	0.094	Half of new 22
23 High	0.413	0.233	0.239	0.272	Half of new 22
23 Very High	0.797	0.540	0.398	0.554	Half of new 22
23 Super	1.693	1.657	1.213	1.543	Half of new 22
24 Normal	0.075	0.005	0.011	0.021	New 23 times 0.040/0.075
24 Moderate	0.139	0.023	0.035	0.050	New 23 times 0.040/0.075
24 High	0.221	0.124	0.127	0.145	New 23 times 0.040/0.075
24 Very High	0.425	0.288	0.212	0.295	New 23 times 0.040/0.075
24 Super	0.903	0.884	0.647	0.823	New 23 times 0.040/0.075
25 Normal	0.0	0.0	0.0	0.0	Set ZEVs to zero
25 Moderate	0.0	0.0	0.0	0.0	Set ZEVs to zero
25 High	0.0	0.0	0.0	0.0	Set ZEVs to zero
25 Very High	0.0	0.0	0.0	0.0	Set ZEVs to zero
25 Super	0.0	0.0	0.0	0.0	Set ZEVs to zero
26 Normal	0.634	0.095	0.167	0.226	New 10 times 0.32/0.39
26 Moderate	1.108	0.292	0.386	0.487	New 10 times 0.32/0.39

26 High	2.296	1.019	1.099	1.305	New 10 times 0.32/0.39		
26 Very High	4.322	2.545	2.475	2.889	New 10 times 0.32/0.39		
26 Super	6.214	8.360	4.458	6.841	New 10 times 0.32/0.39		
27 Normal	0.756	0.063	0.114	0.221	New 13 times 0.32/0.39		
27 Moderate	1.180	0.233	0.334	0.457	New 13 times 0.32/0.39		
27 High	2.256	0.928	0.888	1.192	New 13 times 0.32/0.39		
27 Very High	3.152	3.145	1.991	2.829	New 13 times 0.32/0.39		
27 Super	8.667	8.484	6.212	7.900	New 13 times 0.32/0.39		

Table 4-42 Carbon Monoxide Emission Rate (g/mi.)

Technology Group and Regime			Raw Averages					Final data with adjustments for missing data					
Old Tech	New Tech	Regime	Number	Bag One	Bag Two	Bag 3	Comp	Number	Bag One	Bag Two	Bag 3	Comp	Adjustment Method
1	1	Normal	282	52.253	29.714	24.003	34.318	282	52.253	29.714	24.003	34.318	
1	1	Moderate	279	87.918	75.102	54.468	77.413	279	87.918	75.102	54.468	77.413	
1	1	High	57	133.896	141.613	102.801	137.196	57	133.896	141.613	102.801	137.196	
1	1	Very High	10	211.78	240.439	158.306	211.989	10	211.780	240.439	158.306	211.989	
1	1	Super	0						211.780	240.439	158.306	211.989	Same as Very High
2	2	Normal	126	44.366	23.585	21.601	28.366	126	44.366	23.585	21.601	28.366	
2	2	Moderate	103	85.241	65.966	53.086	65.836	103	85.241	65.966	53.086	65.836	
2	2	High	20	131.508	114.44	86.925	118.47	20	131.508	114.440	86.925	118.470	
2	2	Very High	1	244.6	112.64	67.58	127.57	1	244.600	112.640	67.580	127.570	
2	2	Super	2	109.11	86.02	72.29	87.03	2	244.600	112.640	67.580	127.570	Same as Very High
3	3	Normal	100	18.713	5.75	6.213	8.523	100					

3	3	Moderate	79	31.729	16.477	13.401	18.801	79	18.713	5.750	6.213	8.523				
3	3	High	29	59.054	36.822	30.81	39.843	29	31.729	16.477	13.401	18.801				
3	3	Very High	5	96.35	95.882	73.094	89.724	5	59.054	36.822	30.810	39.843				
3	3	Super	5	127.416	114.968	69.894	105.126	5	96.350	95.882	73.094	89.724				
4	4	Normal	302	19.814	1.462	3.077	5.665	302	127.416	114.968	69.894	105.126				
4	4	Moderate	182	42.707	9.747	11.517	17.047	182	19.814	1.462	3.077	5.665				
4	4	High	84	68.124	37.552	27.713	41.036	84	42.707	9.747	11.517	17.047				
4	4	Very High	48	93.412	68.903	49.495	68.799	48	68.124	37.552	27.713	41.036				
4	4	Super	39	154.177	129.265	96.42	124.643	39	93.412	68.903	49.495	68.799				
5	ELIMINATED	Normal	126	16.009	2.094	3.484	5.333	126	154.177	129.265	96.420	124.643				
5	ELIMINATED	Moderate	121	36.853	15.697	12.57	19.267	121	16.009	2.094	3.484	5.333				
5	ELIMINATED	High	72	71.417	43.638	34.074	46.632	72	36.853	15.697	12.570	19.267				
5	ELIMINATED	Very High	28	86.551	78.054	54.123	73.448	28	71.417	43.638	34.074	46.632				
5	ELIMINATED	Super	19	148.068	136.952	108.756	131.514	19	86.551	78.054	54.123	73.448				
5.1	5	Normal	84	18.878	2.403	3.782	6.149	84	148.068	136.952	108.756	131.514				
5.1	5	Moderate	108	38.744	16.768	12.975	20.331	108	18.878	2.403	3.782	6.149				
5.1	5	High	70	72.395	44.3	34.313	47.231	70	38.744	16.768	12.975	20.331				
5.1	5	Very High	28	86.551	78.054	54.123	73.448	28	72.395	44.300	34.313	47.231				
5.1	5	Super	19	148.068	136.952	108.756	131.514	19	86.551	78.054	54.123	73.448				
5.2	6	Normal	42	10.612	1.527	2.924	3.796	42	148.068	136.952	108.756	131.514				

5.2		6	Moderate	13	21.142	6.802	9.206	10.435	13	10.612	1.527	2.924	3.796	
										21.142	6.802	9.206	10.435	
5.2		6	High	2	37.665	20.77	25.83	25.665	2	37.665	20.770	25.830	25.665	
5.2		6	Very High	0					28	86.551	78.054	54.123	73.448	Old group 5
5.2		6	Super	0					19	148.068	136.952	108.756	131.514	Old group 5
6		7	Normal	761	17.014	1.339	3.122	5.046	761	17.014	1.339	3.122	5.046	
6		7	Moderate	392	40.962	8.03	11.504	15.806	392	40.962	8.030	11.504	15.806	
6		7	High	153	66.819	32.081	30.417	38.847	153	66.819	32.081	30.417	38.847	
6		7	Very High	81	98.204	64.605	50.55	67.76	81	98.204	64.605	50.550	67.760	
6		7	Super	40	148.15	132.765	111.611	129.85	40	148.150	132.765	111.611	129.850	
7		8	Normal	14	16.611	1.662	2.672	5.003	14	16.611	1.662	2.672	5.003	
7		8	Moderate	11	34.54	9.329	9.928	14.756	11	34.540	9.329	9.928	14.756	
7		8	High	2	58.22	38.68	23.715	38.615	2	58.220	38.680	23.715	38.615	
7		8	Very High	4	108.55	80.04	41.8	75.355	4	108.550	80.040	41.800	75.355	
7		8	Super	6	112.862	145.877	102.44	127.168	6	112.862	145.877	102.440	127.168	
7.1	ELIMINATED		Normal	129	15.57	2.219	3.017	5.185	129	15.570	2.219	3.017	5.185	
7.1	ELIMINATED		Moderate	71	32.325	7.015	9.491	12.936	71	32.325	7.015	9.491	12.936	
7.1	ELIMINATED		High	65	51.182	28.371	27.648	33.483	65	51.182	28.371	27.648	33.483	
7.1	ELIMINATED		Very High	12	96.508	76.031	56.968	74.993	12	96.508	76.031	56.968	74.993	
7.1	ELIMINATED		Super	24	135.663	149.737	95.634	132.107	24	135.663	149.737	95.634	132.107	
8.91		9	Normal	396	11.582	1.685	3.927	4.351	396					

8.91	9	Moderate	356	23.136	5.562	8.647	10.05	356	11.582	1.685	3.927	4.351
8.91	9	High	219	42.166	17.798	20.193	23.499	219	23.136	5.562	8.647	10.050
8.91	9	Very High	35	72.744	53.169	49.303	56.155	35	42.166	17.798	20.193	23.499
8.91	9	Super	42	123.235	133.107	98.188	121.369	42	72.744	53.169	49.303	56.155
8.92	10	Normal	199	10.518	2.189	3.882	4.38	199	123.235	133.107	98.188	121.369
8.92	10	Moderate	111	19.599	6.163	8.98	9.717	111	10.518	2.189	3.882	4.380
8.92	10	High	61	39.858	19.665	18.073	23.408	61	19.599	6.163	8.980	9.717
8.92	10	Very High	17	75.878	47.354	55.234	55.433	17	39.858	19.665	18.073	23.408
8.92	10	Super	13	131.436	111.344	98.862	112.078	13	75.878	47.354	55.234	55.433
10	11	Normal	46	11.768	2.588	3.276	4.652	46	131.436	111.344	98.862	112.078
10	11	Moderate	16	22.536	8.128	10.059	11.651	16	11.768	2.588	3.276	4.652
10	11	High	20	40.309	35.668	26.363	34.032	20	22.536	8.128	10.059	11.651
10	11	Very High	2	123.02	60.035	64.375	74.185	2	40.309	35.668	26.363	34.032
10	11	Super	6	106.668	159.625	96.342	131.26	6	123.020	60.035	64.375	74.185
11.1	12	Normal	125	10.404	2.696	3.003	4.378	125	106.668	159.625	96.342	131.260
11.1	12	Moderate	90	17.406	7.737	7.335	9.631	90	10.404	2.696	3.003	4.378
11.1	12	High	46	33.907	19.227	17.011	21.66	46	17.406	7.737	7.335	9.631
11.1	12	Very High	8	57.728	62.511	49.206	57.864	8	33.907	19.227	17.011	21.660
11.1	12	Super	15	126.505	128.693	95.301	119.075	15	57.728	62.511	49.206	57.864
11.2	13	Normal	236	9.387	2.099	2.744	3.788	236	126.505	128.693	95.301	119.075

								9.387	2.099	2.744	3.788	
11.2	13	Moderate	64	16.789	7.023	7.391	9.149	64				
								16.789	7.023	7.391	9.149	
11.2	13	High	21	32.53	22.97	19.602	24.024	21				
								32.530	22.970	19.602	24.024	
11.2	13	Very High	2	48.165	63.3	51.14	56.82	2				
								48.165	63.300	51.140	56.820	
11.2	13	Super	4	85.078	112.158	72.538	95.64	4				
								85.078	112.158	72.538	95.640	
12	14	Normal	17	9.591	3.386	4.202	4.896	17				
								9.591	3.386	4.202	4.896	
12	14	Moderate	24	19.295	8.013	10.565	11.054	24				
								19.295	8.013	10.565	11.054	
12	14	High	5	27.816	15.41	14.354	17.686	5				
								27.816	15.410	14.354	17.686	
12	14	Very High	0					52				From old 12, 8.91 and 8.92
								73.769	51.268	51.242	55.919	
12	14	Super	1	153.75	149.78	136.9	147.07	56				From old 12, 8.91 and 8.92
								125.684	128.353	99.036	119.671	
13	15	Normal	104	8.662	1.761	2.439	3.378	104				
								8.662	1.761	2.439	3.378	
13	15	Moderate	19	16.416	7.941	9.592	10.152	19				
								16.416	7.941	9.592	10.152	
13	15	High	6	26.283	21.517	17.825	21.498	6				
								26.283	21.517	17.825	21.498	
13	15	Very High	0					10				From old 11.1, 11.2, and 13
								55.815	62.669	49.593	57.655	
13	15	Super	0					19				From old 11.1, 11.2, and 13
								117.784	125.212	90.509	114.141	
14	16	Normal	69	17.943	2.081	2.908	5.583	69				
								17.943	2.081	2.908	5.583	
14	16	Moderate	44	35.332	6.031	9.175	12.948	44				
								35.332	6.031	9.175	12.948	
14	16	High	43	56.025	24.497	28.429	32.989	43				
								56.025	24.497	28.429	32.989	
14	16	Very High	6	79.642	78.69	64.61	75.022	6				
								79.642	78.690	64.610	75.022	
14	16	Super	12	161.56	146.723	91.878	134.999	12				
								161.560	146.723	91.878	134.999	
15	17	Normal						4.658	1.645	2.041	2.378	3.4/7 times new 14

15	17	Moderate	9.372	3.892	5.132	5.369	3.4/7 times new 14
15	17	High	13.511	7.485	6.972	8.590	3.4/7 times new 14
15	17	Very High	35.830	24.902	24.889	27.161	3.4/7 times new 14
15	17	Super	61.046	62.343	48.103	58.126	3.4/7 times new 14
16	18	Normal	4.207	0.855	1.185	1.641	3.4/7 times new 15
16	18	Moderate	7.973	3.857	4.659	4.931	3.4/7 times new 15
16	18	High	12.766	10.451	8.658	10.442	3.4/7 times new 15
16	18	Very High	27.110	30.439	24.088	28.004	3.4/7 times new 15
16	18	Super	57.209	60.817	43.961	55.440	3.4/7 times new 15
	19	Normal	4.658	1.645	2.041	2.378	Same as new 17
	19	Moderate	9.372	3.892	5.132	5.369	Same as new 17
	19	High	13.511	7.485	6.972	8.590	Same as new 17
	19	Very High	35.830	24.902	24.889	27.161	Same as new 17
	19	Super	61.046	62.343	48.103	58.126	Same as new 17
	20	Normal	4.207	0.855	1.185	1.641	Same as new 18
	20	Moderate	7.973	3.857	4.659	4.931	Same as new 18
	20	High	12.766	10.451	8.658	10.442	Same as new 18
	20	Very High	27.110	30.439	24.088	28.004	Same as new 18
	20	Super	57.209	60.817	43.961	55.440	Same as new 18
	21	Normal	4.207	0.855	1.185	1.641	Same as new 20
	21	Moderate	7.973	3.857	4.659	4.931	Same as new 20
	21	High	12.766	10.451	8.658	10.442	Same as new 20
	21	Very High	27.110	30.439	24.088	28.004	Same as new 20
	21	Super	57.209	60.817	43.961	55.440	Same as new 20
	22	Normal	4.207	0.855	1.185	1.641	Same as new 21
	22	Moderate	7.973	3.857	4.659	4.931	Same as new 21
	22	High	12.766	10.451	8.658	10.442	Same as new 21
	22	Very High	27.110	30.439	24.088	28.004	Same as new 21
	22	Super	57.209	60.817	43.961	55.440	Same as new 21
	23	Normal	4.207	0.855	1.185	1.641	Same as new 22
	23	Moderate	7.973	3.857	4.659	4.931	Same as new 22
	23	High	12.766	10.451	8.658	10.442	Same as new 22
	23	Very High	27.110	30.439	24.088	28.004	Same as new 22

23 Super	57.209	60.817	43.961	55.440	Same as new 22
24 Normal	2.104	0.428	0.592	0.820	Half of new 23
24 Moderate	3.987	1.929	2.329	2.465	Half of new 23
24 High	6.383	5.226	4.329	5.221	Half of new 23
24 Very High	13.555	15.220	12.044	14.002	Half of new 23
24 Super	28.605	30.409	21.981	27.720	Half of new 23
25 Normal	0.0	0.0	0.0	0.0	Set ZEVs to zero
25 Moderate	0.0	0.0	0.0	0.0	Set ZEVs to zero
25 High	0.0	0.0	0.0	0.0	Set ZEVs to zero
25 Very High	0.0	0.0	0.0	0.0	Set ZEVs to zero
25 Super	0.0	0.0	0.0	0.0	Set ZEVs to zero
26 Normal	6.611	1.376	2.440	2.753	New 10 times 4.4/7
26 Moderate	12.319	3.874	5.645	6.108	New 10 times 4.4/7
26 High	25.054	12.361	11.360	14.714	New 10 times 4.4/7
26 Very High	47.695	29.765	34.719	34.844	New 10 times 4.4/7
26 Super	82.617	69.988	62.142	70.449	New 10 times 4.4/7
27 Normal	5.900	1.319	1.725	2.381	New 13 times 4.4/7
27 Moderate	10.553	4.414	4.646	5.751	New 13 times 4.4/7
27 High	20.447	14.438	12.321	15.101	New 13 times 4.4/7
27 Very High	30.275	39.789	32.145	35.715	New 13 times 4.4/7
27 Super	53.478	70.499	45.595	60.117	New 13 times 4.4/7

Table 4-43 Oxides of Nitrogen Emission Rates (g/mi.)

Technology Group and Regime			Raw Averages					Final data with adjustments for missing data					
Old Tech	New Tech	Regime	Number	Bag One	Bag Two	Bag 3	Comp	Number	Bag One	Bag Two	Bag 3	Comp	Adjustment Method
	1	1 Normal	409	2.778	1.678	3.005	2.421	409	2.778	1.678	3.005	2.421	
	1	1 Moderate	157	4.457	2.741	4.876	3.857	157	4.457	2.741	4.876	3.857	
	1	1 High	46	5.537	3.913	6.359	5.079	46	5.537	3.913	6.359	5.079	
	1	1 Very High	9	5.708	4.096	6.579	4.993	9	5.708	4.096	6.579	4.993	
	1	1 Super	8	8.541	5.592	9.881	6.825	8	8.541	5.592	9.881	6.825	
	2	2 Normal	133	2.508	1.388	2.466	2.015	133	2.508	1.388	2.466	2.015	
	2	2 Moderate	62	4.134	2.502	4.491	3.455	62	4.134	2.502	4.491	3.455	
	2	2 High	29	5.064	3.215	5.087	4.266	29	5.064	3.215	5.087	4.266	
	2	2 Very High	16	5.85	3.1	6.003	4.534	16	5.850	3.100	6.003	4.534	
	2	2 Super	12	7.273	4.887	7.188	6.164	12	7.273	4.887	7.188	6.164	
	3	3 Normal	97	1.79	1.003	1.681	1.352	97	1.790	1.003	1.681	1.352	
	3	3 Moderate	65	2.628	1.593	2.611	2.085	65	2.628	1.593	2.611	2.085	
	3	3 High	51	3.739	2.407	3.903	3.091	51	3.739	2.407	3.903	3.091	
	3	3 Very High	5	5.516	4.356	6.598	5.212	5	5.516	4.356	6.598	5.212	
	3	3 Super	0						5.516	4.356	6.598	5.212	Same as Very High
	4	4 Normal	305	1.955	1.131	1.83	1.49	305	1.955	1.131	1.830	1.490	

4	4	Moderate	168	3.124	1.922	2.931	2.451	168	3.124	1.922	2.931	2.451		
4	4	High	146	4.552	2.99	4.754	3.797	146	4.552	2.990	4.754	3.797		
4	4	Very High	32	6.305	4.699	6.83	5.627	32	6.305	4.699	6.830	5.627		
4	4	Super	4	7.894	6.92	10.59	8.12	4	7.894	6.920	10.590	8.120		
5	ELIMINATED	Normal	167	1.796	0.919	1.465	1.251	167	1.796	0.919	1.465	1.251		
5	ELIMINATED	Moderate	89	2.634	1.609	2.454	2.056	89	2.634	1.609	2.454	2.056		
5	ELIMINATED	High	84	3.727	2.612	3.827	3.181	84	3.727	2.612	3.827	3.181		
5	ELIMINATED	Very High	22	5.313	4.06	5.997	4.849	22	5.313	4.060	5.997	4.849		
5	ELIMINATED	Super	4	5.077	4.98	5.926	5.259	4	5.077	4.980	5.926	5.259		
5.1	5	Normal	144	1.928	0.988	1.593	1.349	144	1.928	0.988	1.593	1.349		
5.1	5	Moderate	73	2.884	1.798	2.75	2.287	73	2.884	1.798	2.750	2.287		
5.1	5	High	69	4.142	2.915	4.254	3.542	69	4.142	2.915	4.254	3.542		
5.1	5	Very High	21	5.465	4.177	6.169	4.988	21	5.465	4.177	6.169	4.988		
5.1	5	Super	2	6.706	7.199	9.637	7.763	2	6.706	7.199	9.637	7.763		
5.2	6	Normal	23	1	0.502	0.702	0.663	23	1.000	0.502	0.702	0.663		
5.2	6	Moderate	16	1.493	0.748	1.102	1	16	1.493	0.748	1.102	1.000		
5.2	6	High	15	1.818	1.22	1.861	1.52	15	1.818	1.220	1.861	1.520		
5.2	6	Very High	1	2.103	1.605	2.388	1.924	22	5.313	4.060	5.997	4.849	Old group 5	
5.2	6	Super	2	3.448	2.761	2.215	2.755	4	5.077	4.980	5.926	5.259	Old group 5	
6	7	Normal	734	1.484	0.791	1.2	1.048	734	1.484	0.791	1.200	1.048		

6	7	Moderate	308	2.274	1.326	1.972	1.699	308	2.274	1.326	1.972	1.699
6	7	High	272	3.231	2.085	3.13	2.61	272	3.231	2.085	3.130	2.610
6	7	Very High	71	4.265	2.963	4.415	3.63	71	4.265	2.963	4.415	3.630
6	7	Super	42	4.892	4.17	5.723	4.772	42	4.892	4.170	5.723	4.772
7	8	Normal	20	1.711	0.725	1.134	1.042	20	1.711	0.725	1.134	1.042
7	8	Moderate	14	2.73	1.291	2.115	1.816	14	2.730	1.291	2.115	1.816
7	8	High	2	2.689	2.008	2.914	2.395	2	2.689	2.008	2.914	2.395
7	8	Very High	1	7.022	2.673	7.048	4.795	1	7.022	2.673	7.048	4.795
7	8	Super	0						7.022	2.673	7.048	4.795
7.1	ELIMINATED	Normal	127	1.275	0.495	0.84	0.749	127	1.275	0.495	0.840	0.749
7.1	ELIMINATED	Moderate	114	2.226	1.105	1.694	1.504	114	2.226	1.105	1.694	1.504
7.1	ELIMINATED	High	31	3.254	1.965	3.04	2.528	31	3.254	1.965	3.040	2.528
7.1	ELIMINATED	Very High	22	4.26	3.016	4.318	3.633	22	4.260	3.016	4.318	3.633
7.1	ELIMINATED	Super	7	5.692	4.58	5.993	5.197	7	5.692	4.580	5.993	5.197
8.91	9	Normal	376	0.857	0.334	0.483	0.483	376	0.857	0.334	0.483	0.483
8.91	9	Moderate	425	1.496	0.724	1.014	0.964	425	1.496	0.724	1.014	0.964
8.91	9	High	128	2.283	1.404	1.832	1.704	128	2.283	1.404	1.832	1.704
8.91	9	Very High	77	3.325	2.194	2.757	2.583	77	3.325	2.194	2.757	2.583
8.91	9	Super	42	5.375	3.882	4.853	4.458	42	5.375	3.882	4.853	4.458
8.92	10	Normal	206	0.814	0.325	0.47	0.466	206	0.814	0.325	0.470	0.466

8.92	10 Moderate	143	1.37	0.732	0.976	0.931	143	1.370	0.732	0.976	0.931
8.92	10 High	30	2.051	1.464	1.745	1.662	30	2.051	1.464	1.745	1.662
8.92	10 Very High	15	2.98	2.297	2.821	2.583	15	2.980	2.297	2.821	2.583
8.92	10 Super	7	4.075	4.076	4.662	4.237	7	4.075	4.076	4.662	4.237
10	11 Normal	34	1.344	0.428	0.929	0.755	34	1.344	0.428	0.929	0.755
10	11 Moderate	36	2.337	1.14	1.881	1.597	36	2.337	1.140	1.881	1.597
10	11 High	11	3.654	2.192	3.48	2.85	11	3.654	2.192	3.480	2.850
10	11 Very High	7	4.637	2.905	4.386	3.671	7	4.637	2.905	4.386	3.671
10	11 Super	2	5.815	3.74	5.584	4.677	2	5.815	3.740	5.584	4.677
11.1	12 Normal	59	0.895	0.294	0.556	0.491	59	0.895	0.294	0.556	0.491
11.1	12 Moderate	134	1.595	0.776	1.114	1.039	134	1.595	0.776	1.114	1.039
11.1	12 High	62	2.39	1.367	1.886	1.721	62	2.390	1.367	1.886	1.721
11.1	12 Very High	21	3.307	2.028	2.746	2.49	21	3.307	2.028	2.746	2.490
11.1	12 Super	8	4.515	4.122	4.58	4.329	8	4.515	4.122	4.580	4.329
11.2	13 Normal	184	0.926	0.254	0.421	0.438	184	0.926	0.254	0.421	0.438
11.2	13 Moderate	113	1.513	0.748	1.021	0.982	113	1.513	0.748	1.021	0.982
11.2	13 High	20	2.329	1.368	1.828	1.694	20	2.329	1.368	1.828	1.694
11.2	13 Very High	8	3.038	1.968	2.527	2.343	8	3.038	1.968	2.527	2.343
11.2	13 Super	2	5.804	4.987	6.382	5.54	2	5.804	4.987	6.382	5.540
12	14 Normal	11	0.646	0.181	0.252	0.297	11	0.646	0.181	0.252	0.297

12	14 Moderate	17	0.995	0.369	0.5	0.535	17	0.995	0.369	0.500	0.535		
12	14 High	8	1.246	0.752	0.983	0.919	8	1.246	0.752	0.983	0.919		
12	14 Very High	6	2.202	1.075	1.548	1.439	6	2.202	1.075	1.548	1.439		
12	14 Super	5	2.84	2.124	2.575	2.395	5	2.840	2.124	2.575	2.395		
13	15 Normal	72	0.641	0.123	0.219	0.257	72	0.641	0.123	0.219	0.257		
13	15 Moderate	34	1.116	0.341	0.613	0.577	34	1.116	0.341	0.613	0.577		
13	15 High	9	1.481	0.727	1.125	0.993	9	1.481	0.727	1.125	0.993		
13	15 Very High	7	2.338	1.208	1.768	1.597	7	2.338	1.208	1.768	1.597		
13	15 Super	7	3.318	2.195	3.173	2.697	7	3.318	2.195	3.173	2.697		
14	16 Normal	73	1.116	0.462	0.715	0.663	73	1.116	0.462	0.715	0.663		
14	16 Moderate	64	2.061	1.047	1.503	1.383	64	2.061	1.047	1.503	1.383		
14	16 High	18	3.073	1.822	2.786	2.346	18	3.073	1.822	2.786	2.346		
14	16 Very High	14	3.874	3.096	4.089	3.53	14	3.874	3.096	4.089	3.530		
14	16 Super	5	5.643	4.916	6.156	5.406	5	5.643	4.916	6.156	5.406		
15	17 Normal							0.646	0.181	0.252	0.297	Same as new 14	
15	17 Moderate							0.995	0.369	0.500	0.535	Same as new 14	
15	17 High							1.246	0.752	0.983	0.919	Same as new 14	
15	17 Very High							2.202	1.075	1.548	1.439	Same as new 14	
15	17 Super							2.840	2.124	2.575	2.395	Same as new 14	
16	18 Normal							0.641	0.123	0.219	0.257	Same as new 15	
16	18 Moderate							1.116	0.341	0.613	0.577	Same as new 15	
16	18 High							1.481	0.727	1.125	0.993	Same as new 15	
16	18 Very High							2.338	1.208	1.768	1.597	Same as new 15	
16	18 Super							3.318	2.195	3.173	2.697	Same as new 15	
	19 Normal							0.646	0.181	0.252	0.297	Same as new 17	
	19 Moderate							0.995	0.369	0.500	0.535	Same as new 17	

19 High	1.246	0.752	0.983	0.919	Same as new 17
19 Very High	2.202	1.075	1.548	1.439	Same as new 17
19 Super	2.840	2.124	2.575	2.395	Same as new 17
20 Normal	0.641	0.123	0.219	0.257	Same as new 18
20 Moderate	1.116	0.341	0.613	0.577	Same as new 18
20 High	1.481	0.727	1.125	0.993	Same as new 18
20 Very High	2.338	1.208	1.768	1.597	Same as new 18
20 Super	3.318	2.195	3.173	2.697	Same as new 18
21 Normal	0.641	0.123	0.219	0.257	Same as new 20
21 Moderate	1.116	0.341	0.613	0.577	Same as new 20
21 High	1.481	0.727	1.125	0.993	Same as new 20
21 Very High	2.338	1.208	1.768	1.597	Same as new 20
21 Super	3.318	2.195	3.173	2.697	Same as new 20
22 Normal	0.641	0.123	0.219	0.257	Same as new 21
22 Moderate	1.116	0.341	0.613	0.577	Same as new 21
22 High	1.481	0.727	1.125	0.993	Same as new 21
22 Very High	2.338	1.208	1.768	1.597	Same as new 21
22 Super	3.318	2.195	3.173	2.697	Same as new 21
23 Normal	0.321	0.062	0.110	0.129	Half of new 22
23 Moderate	0.558	0.171	0.307	0.289	Half of new 22
23 High	0.741	0.364	0.563	0.497	Half of new 22
23 Very High	1.169	0.604	0.884	0.799	Half of new 22
23 Super	1.659	1.098	1.587	1.349	Half of new 22
24 Normal	0.321	0.062	0.110	0.129	Same as new 23
24 Moderate	0.558	0.171	0.307	0.289	Same as new 23
24 High	0.741	0.364	0.563	0.497	Same as new 23
24 Very High	1.169	0.604	0.884	0.799	Same as new 23
24 Super	1.659	1.098	1.587	1.349	Same as new 23
25 Normal	0.0	0.0	0.0	0.0	Set ZEVs to zero
25 Moderate	0.0	0.0	0.0	0.0	Set ZEVs to zero
25 High	0.0	0.0	0.0	0.0	Set ZEVs to zero
25 Very High	0.0	0.0	0.0	0.0	Set ZEVs to zero
25 Super	0.0	0.0	0.0	0.0	Set ZEVs to zero
26 Normal	0.814	0.325	0.470	0.466	Same as new 10
26 Moderate	1.370	0.732	0.976	0.931	Same as new 10
26 High	2.051	1.464	1.745	1.662	Same as new 10
26 Very High	2.980	2.297	2.821	2.583	Same as new 10
26 Super	4.075	4.076	4.662	4.237	Same as new 10
27 Normal	0.926	0.254	0.421	0.438	Same as new 13
27 Moderate	1.513	0.748	1.021	0.982	Same as new 13

27 High	2.329	1.368	1.828	1.694	Same as new 13
27 Very High	3.038	1.968	2.527	2.343	Same as new 13
27 Super	5.804	4.987	6.382	5.540	Same as new 13

4.7 U.C. Based Emission Rates

The basic without I&M rates are based on the FTP driving cycle. In MVEI7G, to better represent more contemporary driving, these rates FTP based rates were multiplied by cycle-correction factors and corrected using speed correction factors. However, since then more data had been collected from vehicles that were tested on both the FTP and the UC test. Ideally one could develop regression relationship describing the variation in the UC based emissions from the FTP tests. This relationship could then be used in converting the basic FTP rates to a UC basis.

CARB's database on vehicles tested over both the UC and FTP tests exceeds 1300. This data was analyzed to develop the following relationship.

$UC = e^{b} * (FTP)^{m}$ [4-7]

Where b and m are the regression coefficients.

Table 4-44 and 4-45 shows these coefficients for Bag 1 and 2, respectively.

Table 4-44 Regression Coefficients for Bag 1

Tech. & MY Groups	n	HC			CO			NOx		
		m	b	R^2	m	b	R^2	m	b	R^2
Fuel Injected										
81 to 85	73	0.74	1.08	0.68	0.70	1.69	0.63	0.70	0.66	0.73
86 to 92	368	0.86	1.01	0.60	0.74	1.60	0.56	0.76	0.79	0.65
GE to 93	128	0.90	1.04	0.76	0.85	1.36	0.67	0.97	0.89	0.67
LE to 80	31	0.90	1.04	0.84	0.84	1.46	0.82	0.56	0.67	0.41
Throttle Body										
81 to 84	37	0.80	1.04	0.85	0.82	1.53	0.84	0.80	0.52	0.79
GE to 85	155	0.69	1.06	0.61	0.64	1.95	0.62	0.78	0.64	0.73
Carburetor										
75 to 80	185	0.84	1.14	0.70	0.82	1.48	0.80	0.86	0.37	0.76
81 to 85	175	0.84	1.00	0.78	0.80	1.41	0.75	0.80	0.50	0.70
GE to 86	101	0.74	1.08	0.74	0.77	1.56	0.73	0.69	0.58	0.60
Non-Cat										
LE to 79	95	0.72	1.30	0.64	0.78	1.66	0.81	0.86	0.23	0.78

Table 4-45 Regression Coefficients for Bag 2

Tech. & MY Groups	n	HC			CO			NOx		
		m	b	R^2	m	b	R^2	m	b	R^2
Fuel Injected										
81 to 85	73	0.74	-0.24	0.84	0.59	1.12	0.63	0.76	0.46	0.74
86 to 92	368	0.62	-0.44	0.63	0.54	0.99	0.38	0.69	0.25	0.64
GE to 93	128	0.52	-1.17	0.44	0.60	0.57	0.37	0.56	-0.30	0.42
LE to 80	31	0.77	-0.10	0.77	0.65	0.87	0.61	0.64	0.81	0.59
Throttle Body										
81 to 84	37	0.71	-0.10	0.81	0.44	1.96	0.49	0.63	0.45	0.80
GE to 85	155	0.67	0.24	0.72	0.43	1.43	0.37	0.64	0.34	0.76
Carburetor										
75 to 80	185	0.74	0.11	0.75	0.54	1.82	0.61	0.92	0.47	0.65
81 to 85	175	0.74	0.08	0.78	0.48	1.87	0.53	0.74	0.37	0.58
GE to 86	101	0.72	0.11	0.81	0.49	1.79	0.55	0.67	0.29	0.70
Non-Cat										
LE to 79	95	0.59	0.48	0.59	0.59	1.62	0.58	0.81	0.73	0.58